

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

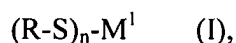
Listing of Claims:

1. (Withdrawn) A method for performing mass spectrometry of sulfur atom-containing derivatives of an organic residue, characterized in that the method comprises ionizing a metal-organic residue complex into the derivatives, wherein the complex has the organic residue bound through a sulfur atom to the metal.

2. (Withdrawn) A method for performing mass spectrometry of a compound or salt thereof, characterized in that the method comprises ionizing a metal-organic residue complex into sulfur atom-containing derivatives,

wherein the metal-organic residue complex is represented by the general formula

(I)



wherein R is an organic residue, S is a sulfur atom and n indicates a stoichiometric ratio of (R-S) group with respect to M^I and is an integer equal to or greater than 1; and

wherein the compound is represented by the general formulae (II) and/or

(III):

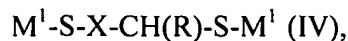


wherein R and S are the same as defined above.

3. (Withdrawn) A method for performing mass spectrometry of a compound or salt thereof, characterized in that the method comprises ionizing a metal-organic residue complex into sulfur atom-containing derivatives,

wherein the metal-organic residue complex is represented by the general formula

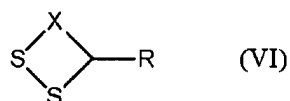
(IV):



wherein R is an organic residue, S is a sulfur atom, M^I at both ends are same metal entities, X is a lower alkylene or a lower alkenylene;

wherein the compound is represented by the general formulae (V) and/or

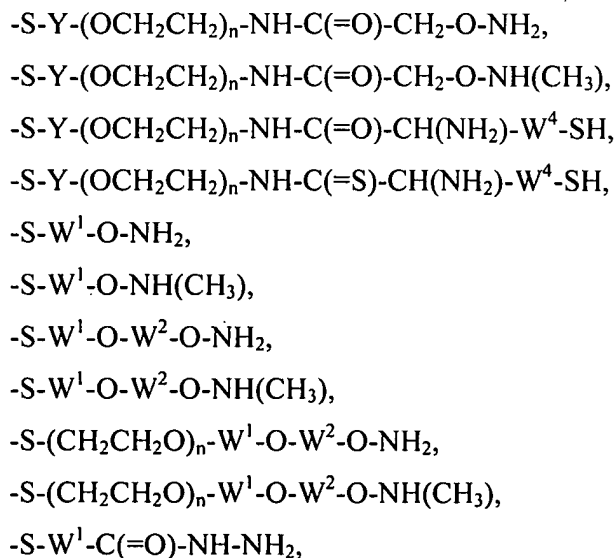
(VI):



wherein R, S and X are the same as defined above.

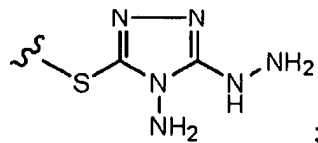
4. (Currently Amended) A method for performing mass spectrometry of a sugar chain or a sugar chain-containing substance, the method comprising:

1) contacting a metal-organic residue complex with a sugar chain or a sugar chain-containing substance under conditions where the metal-organic residue complex and the sugar chain or sugar chain-containing substance react with each other, wherein the metal-organic residue complex comprises a metal in solution bound to an organic residue -having one of the following structures:



$-S-W^1-C(=S)-NH-NH_2$,
 $-S-W^1-NH-C(=O)-CH(NH_2)-W^4-SH$,
 $-S-W^1-NH-C(=S)-CH(NH_2)-W^4-SH$
 $-S-Z^1-Z^2-Z^3-Z^4-Z^5-O-NH_2$,
 $-S-Z^1-Z^2-Z^3-Z^4-Z^5-O-NH(CH_3)$,
 $-S-Z^1-Z^2-Z^3-Z^4-CH(NH_2)-O-Z^6-SH$,
 $-S-Z^1-Z^2-Z^3-Z^4-CH(NH_2)-Z^6-SH$,
 $-S-Z^1-O-Z^3-CH(NH_2)-Z^6-SH$,
 $-S-Z^1-O-Z^3-O-NH_2$,
 $-S-Z^1-O-Z^3-O-NH(CH_3)$,
 $-S-Z^1-O-Z^3-Z^4-Z^5-O-NH_2$,
 $-S-Z^1-O-Z^3-Z^4-Z^5-O-NH(CH_3)$,
 $-S-Z^1-O-Z^3-Z^4-CH(NH_2)-O-Z^6-SH$
 $-S-Z^1-O-Z^3-Z^4-CH(NH_2)-Z^6-SH$
 $-S-Z^1-Z^3-Z^4-Z^5-O-NH_2$,
 $-S-Z^1-Z^3-Z^4-Z^5-O-NH(CH_3)$,
 $-S-Z^1-Z^3-Z^4-CH(NH_2)-O-Z^6-SH$,
 $-S-Z^1-Z^3-Z^4-CH(NH_2)-Z^6-SH$,

or



wherein, Y, W¹ and W² are each independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W⁴ is C1-C2 alkylene;

Z¹ is substituted or unsubstituted arylene or heteroarylene;

Z² is a nitrogen-containing heterocycle;

Z³ and Z⁵ are each independently C1-C12 alkylene;

Z⁴ is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

Z⁶ is C1-C2 alkylene; and

n is an integer ranging from 1 to 10,

2) recovering the metal-organic residue complex bound to the sugar chain or the sugar chain-containing substance; and

3) performing mass spectrometric analysis of a solution comprising the metal-organic residue complex bound to the sugar chain or the sugar chain-containing substance by ionizing the metal-organic residue complex bound to the sugar chain or the sugar chain-containing substance into -sulfur atom-containing derivatives of the organic residue, and wherein the metal comprises a surface which enables diffuse reflection of a laser beam.

5. (Withdrawn) A method according to any one of claims 1 to 4, wherein the metal has a surface enough to cause a diffuse reflection of a laser beam.

6. (Withdrawn) A method according to claim 5, wherein the metal is a fine metal particle.

7. (Withdrawn) A method according to any one of claims 1 to 4 and 6, wherein the metal is gold, silver, cadmium or selenium.

8. (Withdrawn) A method according to any one of claims 1 to 4 and 6, wherein the mass spectrometry is carried out by MALDI-TOF MS method.

9. (Withdrawn) A method according to any one of claims 1 to 3, wherein the organic residue is a group comprising a sugar chain or a sugar chain-containing substance.

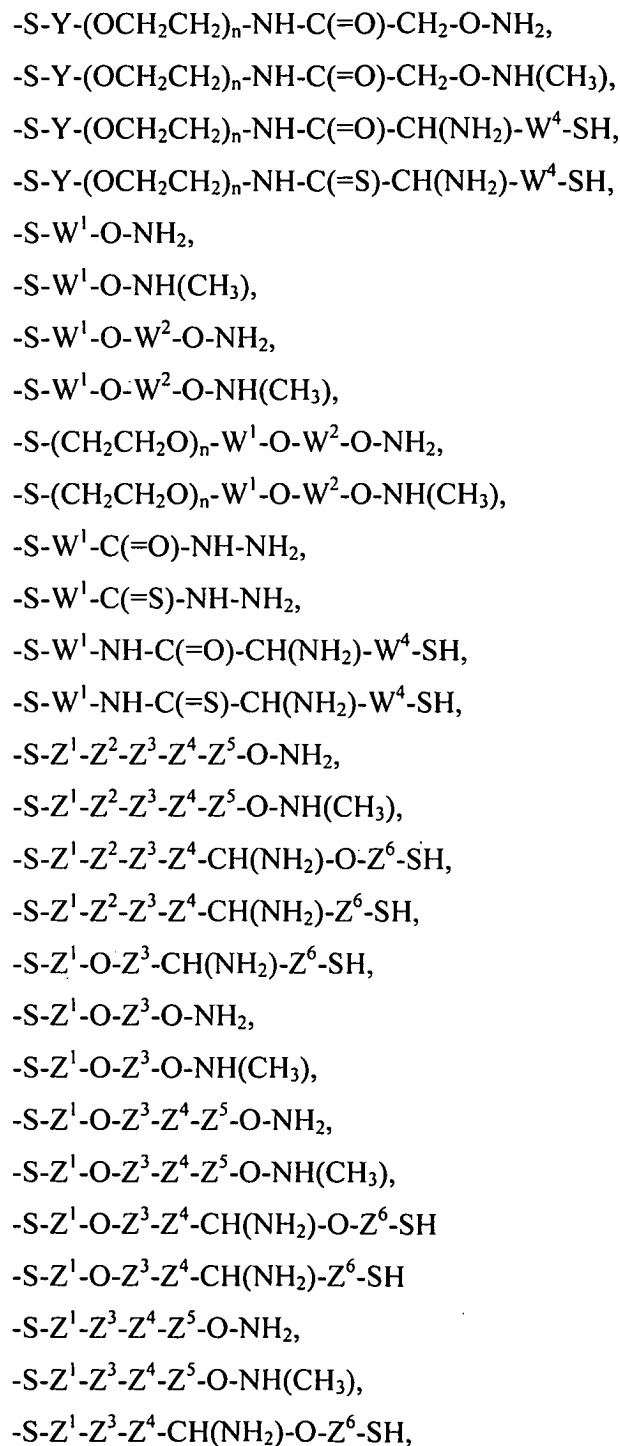
10. (Withdrawn) A method for performing mass spectrometry of a sulfur atom-containing analyte comprising the steps of:

1) reacting tetrachloroauric acid with a sulfur atom-containing analyte in the presence of a reducing agent;

2) obtaining a gold-analyte complex particle which has the analyte bound through the sulfur atom to the gold; and

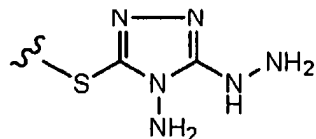
3) ionizing the obtained gold-analyte complex particles into a sulfur atom-containing analyte derivative.

11. (Withdrawn) A metal-organic residue complex containing a metal bound to a group represented by the following formula:





or



wherein, Y, W¹ and W² are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W⁴ is C1-C2 alkylene;

Z¹ is substituted or unsubstituted arylene or heteroarylen;

Z² is a nitrogen-containing heterocycle;

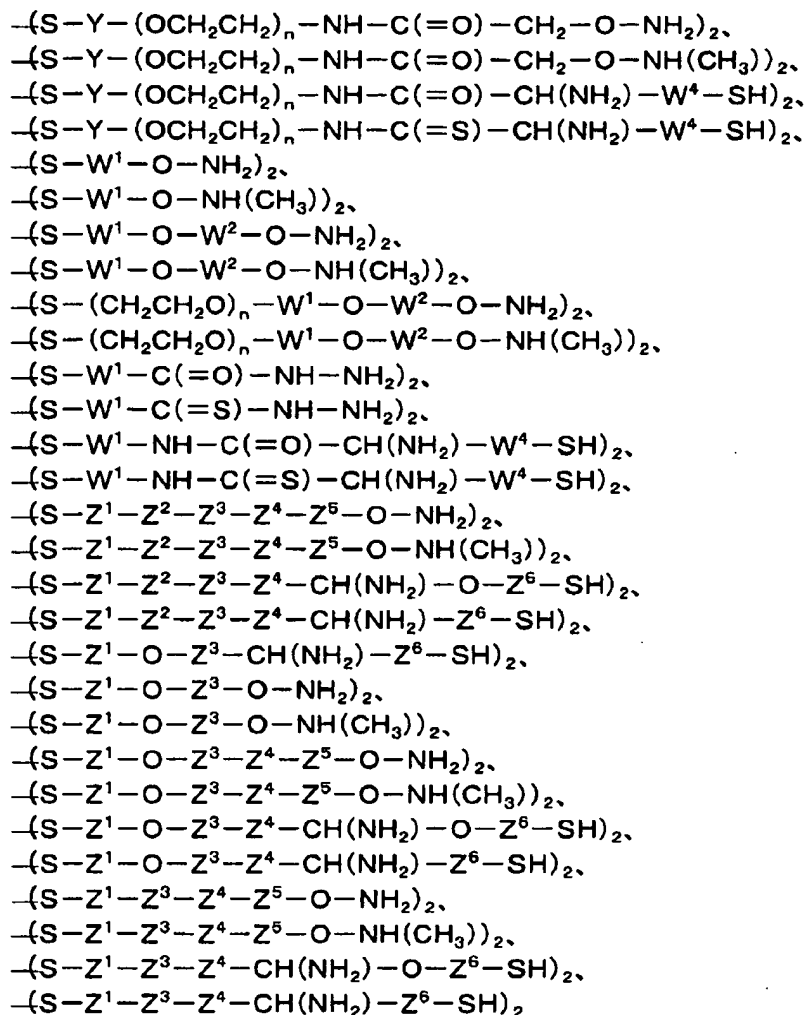
Z³ and Z⁵ are independently C1-C12 alkylene;

Z⁴ is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

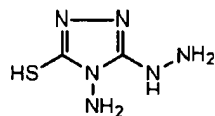
Z⁶ is C1-C2 alkylene; and

n is an integer between 1 and 10, inclusive.

12. (Withdrawn) A method for producing metal-organic residue complex particles, wherein the method comprises reacting tetrachloroauric acid with a compound represented by the following formula:



or



, or a salt thereof, in the presence of a reducing agent,

wherein, Y, W¹ and W² are independently C1-C12 alkylene,

C2-C12 alkenylene or C2-C12 alkynylene;

W⁴ is C1-C2 alkylene;

Z¹ is substituted or unsubstituted arylene or heteroarylene;

Z² is a nitrogen-containing heterocycle;

Z³ and Z⁵ are independently C1-C12 alkylene;

Z^4 is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

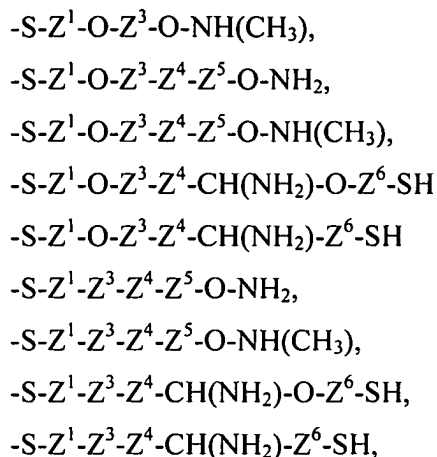
Z^6 is C1-C2 alkylene; and

n is an integer between 1 and 10, inclusive.

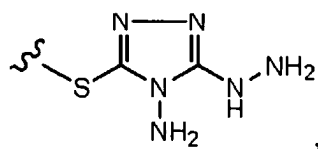
13. (Currently Amended) A method for trapping a sugar chain or a sugar chain-containing substance, the method comprising contacting a metal-organic residue complex with a sugar chain or a sugar chain-containing substance under conditions where the metal-organic residue complex and the sugar chain or the sugar chain-containing substance react with each other, wherein

the metal-organic residue complex comprises a metal in solution bound to an organic residue having one of the following structures:

-S-Y-(OCH₂CH₂)_n-NH-C(=O)-CH₂-O-NH₂,
 -S-Y-(OCH₂CH₂)_n-NH-C(=O)-CH₂-O-NH(CH₃),
 -S-Y-(OCH₂CH₂)_n-NH-C(=O)-CH(NH₂)-W⁴-SH,
 -S-Y-(OCH₂CH₂)_n-NH-C(=S)-CH(NH₂)-W⁴-SH,
 -S-W¹-O-NH₂,
 -S-W¹-O-NH(CH₃),
 -S-W¹-O-W²-O-NH₂,
 -S-W¹-O-W²-O-NH(CH₃),
 -S-(CH₂CH₂O)_n-W¹-O-W²-O-NH₂,
 -S-(CH₂CH₂O)_n-W¹-O-W²-O-NH(CH₃),
 -S-W¹-C(=O)-NH-NH₂,
 -S-W¹-C(=S)-NH-NH₂,
 -S-W¹-NH-C(=O)-CH(NH₂)-W⁴-SH,
 -S-W¹-NH-C(=S)-CH(NH₂)-W⁴-SH,
 -S-Z¹-Z²-Z³-Z⁴-Z⁵-O-NH₂,
 -S-Z¹-Z²-Z³-Z⁴-Z⁵-O-NH(CH₃),
 -S-Z¹-Z²-Z³-Z⁴-CH(NH₂)-O-Z⁶-SH,
 -S-Z¹-Z²-Z³-Z⁴-CH(NH₂)-Z⁶-SH,
 -S-Z¹-O-Z³-CH(NH₂)-Z⁶-SH,
 -S-Z¹-O-Z³-O-NH₂,



or



wherein, Y, W¹ and W² are each independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W⁴ is C1-C2 alkylene;

Z¹ is substituted or unsubstituted arylene or heteroarylene;

Z² is a nitrogen-containing heterocycle;

Z³ and Z⁵ are each independently C1-C12 alkylene;

Z⁴ is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

Z⁶ is C1-C2 alkylene; and

n is an integer ranging from 1 to 10, and

wherein the metal comprises a surface which enables diffuse reflection of a laser beam.

14. (Withdrawn) A method for measuring the molecular weight of a substance which may interact with an organic residue of a metal-organic residue complex, comprising the steps of:

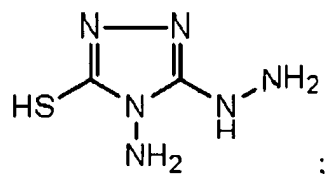
1) contacting the metal-organic residue complex with a substance which may interact with the organic residue, wherein the metal is bound through a sulfur atom to organic residue;

2) obtaining the metal-organic residue complex bound to the substance which may interact; and

3) ionizing the obtained metal-organic residue complex into derivatives of the organic residue, wherein the organic residue contains a sulfur atom.

15. (Currently Amended) A method for performing mass spectrometry of a sugar chain or a sugar chain-containing substance, the method comprising:

1) contacting an organic residue -with a metal in solution to obtain a metal-organic residue complex, wherein the ~~compound~~-organic residue has the following formula:

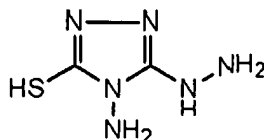


2) contacting the metal-organic residue complex obtained in 1) with a sugar chain or a sugar chain-containing substance under conditions where the metal-organic residue complex and the sugar chain or the sugar chain-containing substance react with each other; and

3) performing mass spectrometric analysis of a solution comprising the metal-organic residue complex bound to the sugar chain or the sugar chain-containing substance obtained in step 2) by ionizing the metal-organic residue complex bound to the sugar chain or sugar chain containing substance obtained in 2) into derivatives of the organic residue, wherein the derivatives of the organic residue comprise a sulfur atom, and wherein the metal comprises a surface which enables diffuse reflection of a laser beam.

16. (Currently Amended) A method for performing mass spectrometry of a sugar chain or a sugar chain-containing substance, the method comprising:

1) contacting an organic residue -having the following formula:



with a sugar chain or a sugar chain-containing substance under conditions where the compound and the sugar chain or the sugar chain-containing substance react with each other to obtain an organic residue complex bound to the sugar chain or sugar chain containing substance;

2) contacting the organic residue complex bound to the sugar chain or sugar chain containing substance obtained in 1) with a metal in solution to obtain a metal-organic residue complex bound to the sugar chain or sugar chain containing substance; and

3) performing mass spectrometric analysis of a solution comprising the metal-organic residue complex bound to the sugar chain or the sugar chain-containing substance by ionizing the metal-organic residue complex bound to the sugar chain or sugar chain containing substance obtained in 2) into derivatives of the organic residue, wherein the derivatives of the organic residue contain a sulfur atom, and wherein the metal comprises a surface which enables diffuse reflection of a laser beam.

17. (Withdrawn) A composition for trapping a sugar chain, comprising:

a compound represented by the general formula (II):

R-SH (II) or a salt thereof, wherein R is an organic residue; and S is a sulfur atom;

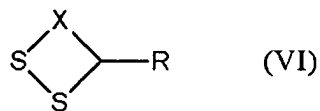
a compound represented by the general formula (III):

R-S-S-R (III) or a salt thereof, wherein, R and S are the same as defined above;

a compound represented by the general formula (V):

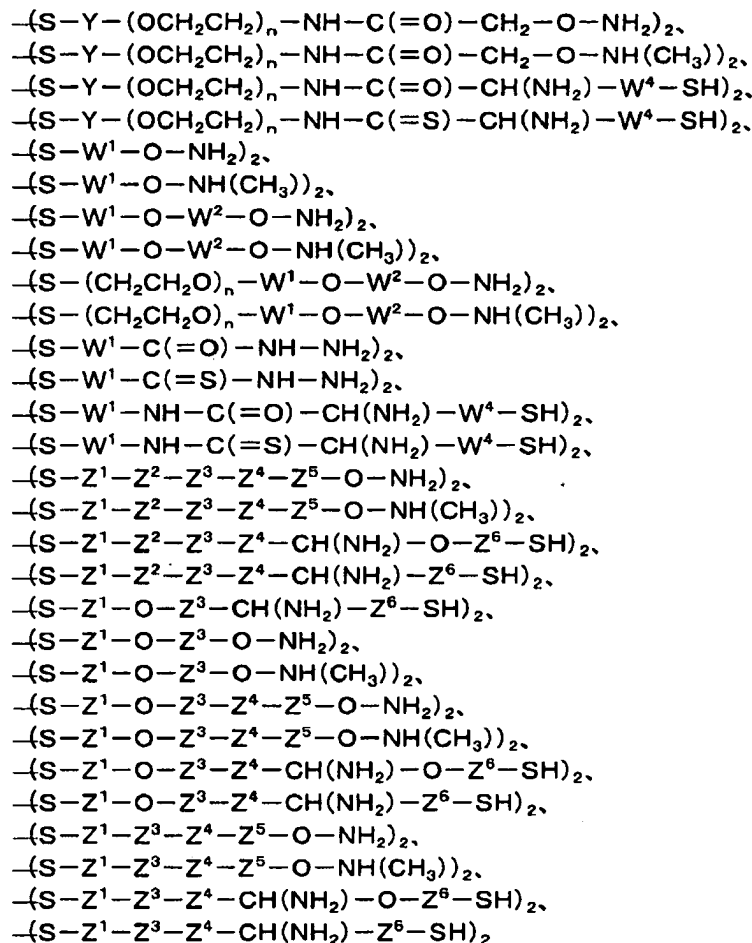
HS-X-CH(R)-SH (V) or a salt thereof, wherein R and S are the same as defined above; and X is lower alkylene or lower alkenylene; or

a compound represented by the general formula (VI):

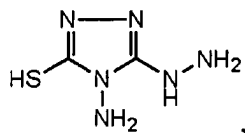


or a salt thereof, wherein, R, S and X are the same as defined above; or a mixture thereof.

18. (Withdrawn) The composition of claim 17 wherein the compound is represented by the following formula:



or



wherein Y, W¹ and W² are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W⁴ is C1-C2 alkylene;

Z¹ is substituted or unsubstituted arylen or heteroarylen;

Z² is a nitrogen-containing heterocycle;

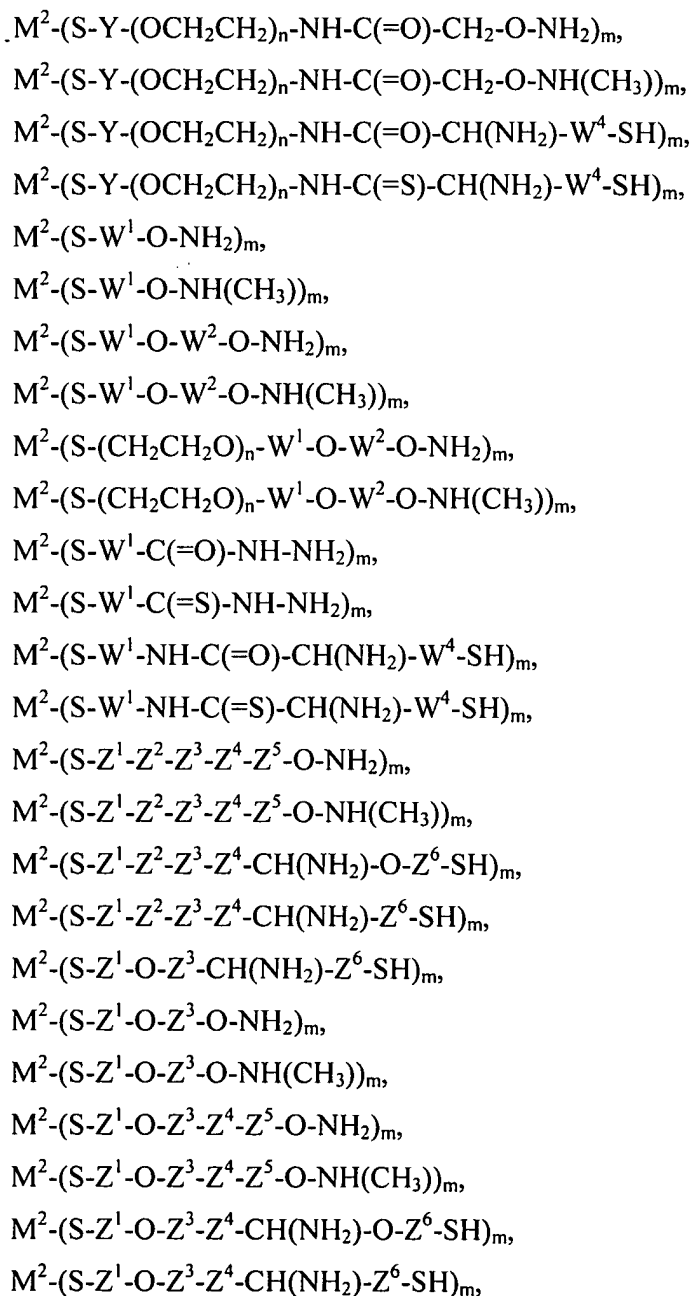
Z³ and Z⁵ are independently C1-C12 alkylene;

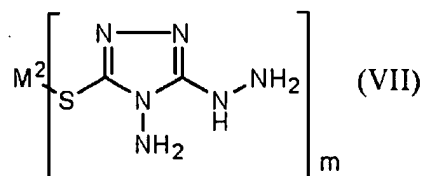
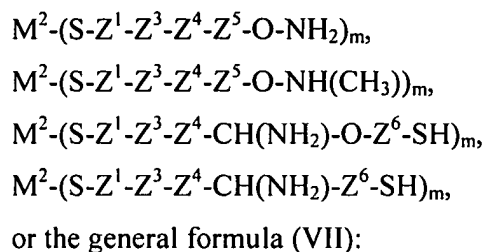
Z^4 is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

Z^6 is C1-C2 alkylene; and

n is an integer between 1 and 10, inclusive.

19. (Withdrawn) A metal-organic residue complex represented by the following formula:





wherein, M^2 is a metal;

m indicates a stoichiometric ratio of an organic residue with respect to M^2 and is an integer equal to or greater than 1, wherein the organic residue contains a sulfur atom;

Y , W^1 and W^2 are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W^4 is C1-C2 alkylene;

Z^1 is substituted or unsubstituted arylene or heteroarylene ;

Z^2 is a nitrogen-containing heterocycle;

Z^3 and Z^5 are independently C1-C12 alkylene;

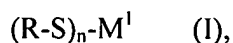
Z^4 is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

Z^6 is C1-C2 alkylene; and

n is an integer between 1 and 10, inclusive.

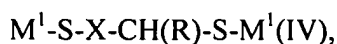
20. (Withdrawn) A composition for trapping a sugar chain, comprising:

a metal-organic residue complex represented by the general formula (I):



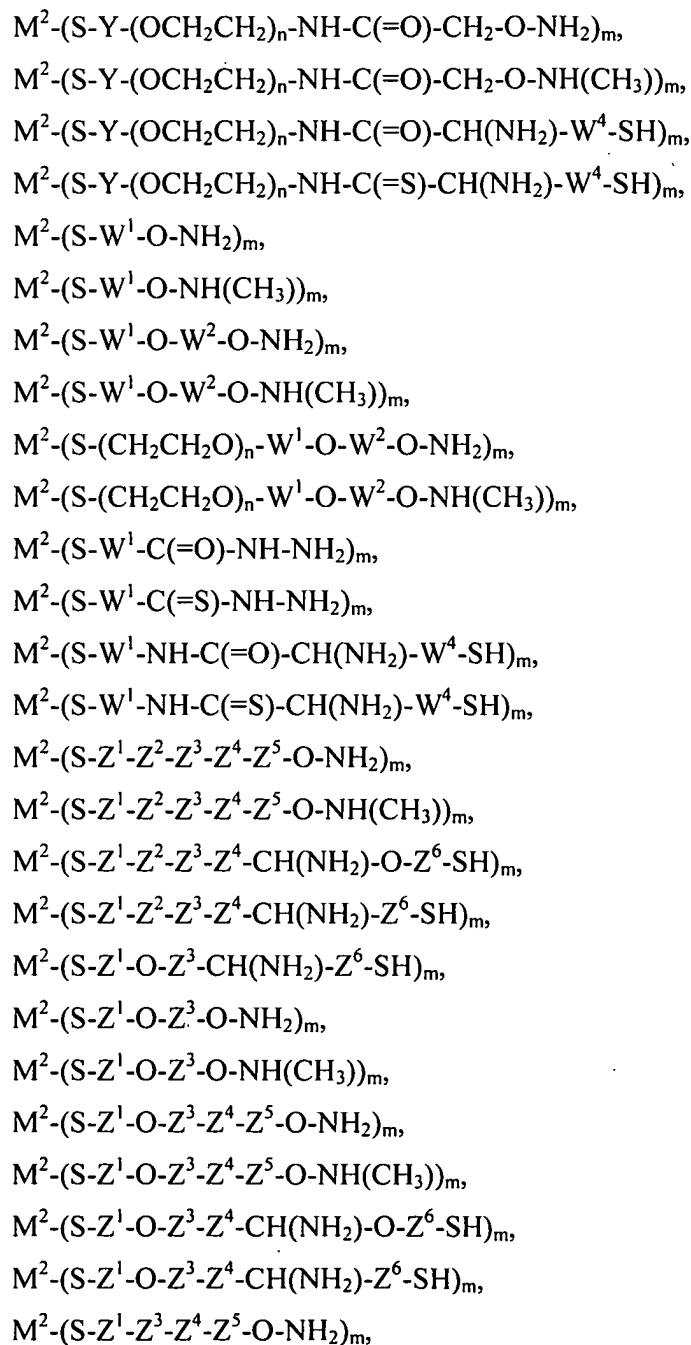
wherein R is an organic residue; S is a sulfur atom; M^1 is a metal; and n indicates a stoichiometric ratio of $(R-S)$ group with respect to M^1 and is an integer equal to or greater than 1; or

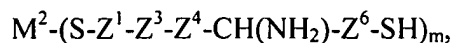
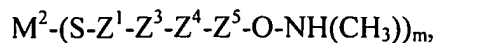
a metal-organic residue complex represented by the general formula (IV):



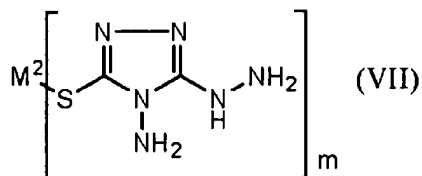
wherein R and S are the same as defined above, M^1 at both ends are a metal of the same substance and X is lower alkylene or lower alkenylene.

21. (Withdrawn) The composition of claim 20 wherein the metal-organic residue complex is represented by the following formula:





or the general formula (VII):



wherein,

M^2 is a metal;

m indicates a stoichiometric ratio of an organic residue with respect to M^2 and is an integer equal to or greater than 1, wherein the organic residue comprises a sulfur atom;

Y , W^1 and W^2 are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W^4 is C1-C2 alkylene;

Z^1 is substituted or unsubstituted arylene or heteroarylene;

Z^2 is a nitrogen-containing heterocycle;

Z^3 and Z^5 are independently C1-C12 alkylene;

Z^4 is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

Z^6 is C1-C2 alkylene and

n is an integer between 1 and 10, inclusive.

22. (Withdrawn) A kit for mass spectrometry of a sugar chain or a sugar chain-containing substance, comprising:

A) a compound represented by the general formula (II):



or a salt thereof, wherein R is an organic residue; and S is a sulfur atom;



(III)

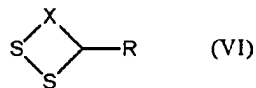
or a salt thereof, wherein R and S are the same as defined above;

a compound represented by the general formula (V):



or a salt thereof, wherein R and S are the same as defined above; and X is lower alkylene or lower alkenylene; or

a compound represented by the general formula (VI):

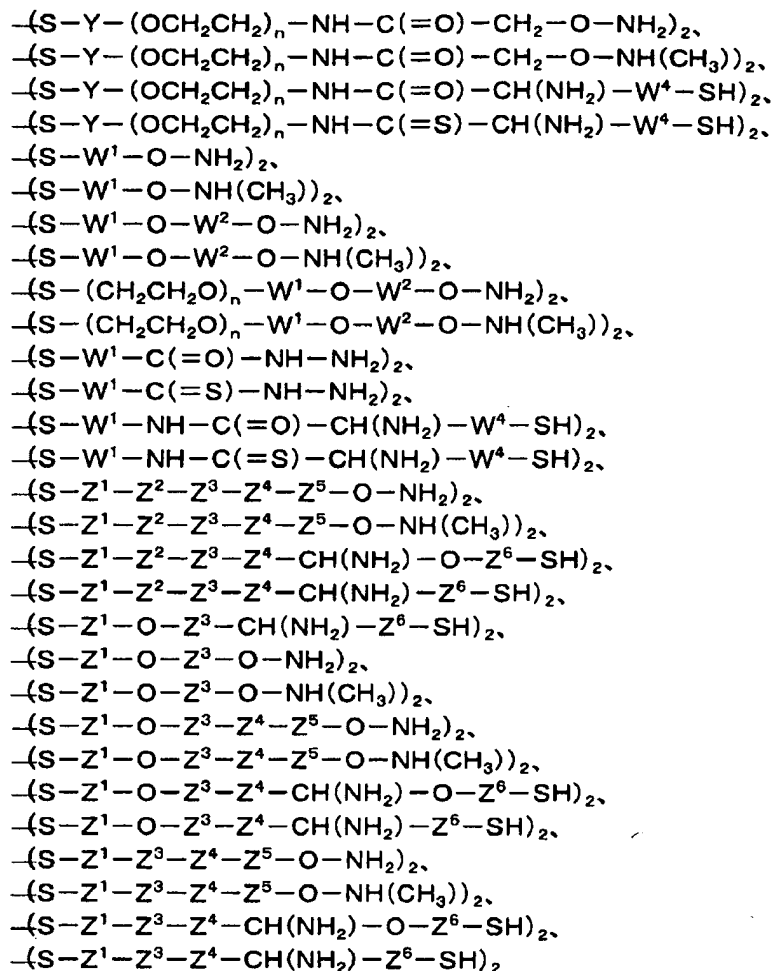


or a salt thereof, wherein R, S and X are the same as defined above; or a mixture thereof; and

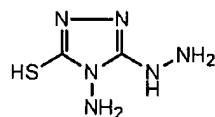
B) a metal.

23. (Withdrawn) A kit for mass spectrometry of a sugar chain or a sugar chain-containing substance, comprising:

A) a sulfur atom containing derivatives of an organic residue, represented by the following formula:



or



wherein Y, W¹ and W² are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W⁴ is C1-C2 alkylene;

Z¹ is substituted or unsubstituted arylene or heteroarylene;

Z² is a nitrogen-containing heterocycle;

Z³ and Z⁵ are independently C1-C12 alkylene;

Z⁴ is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

Z⁶ is C1-C2 alkylene; and

n is an integer between 1 and 10, inclusive; and
 B) a metal.

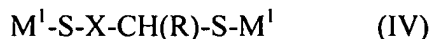
24. (Withdrawn) A kit for mass spectrometry of a sugar chain or a sugar chain-containing substance, comprising:

a metal-organic residue complex represented by the general formula (I):



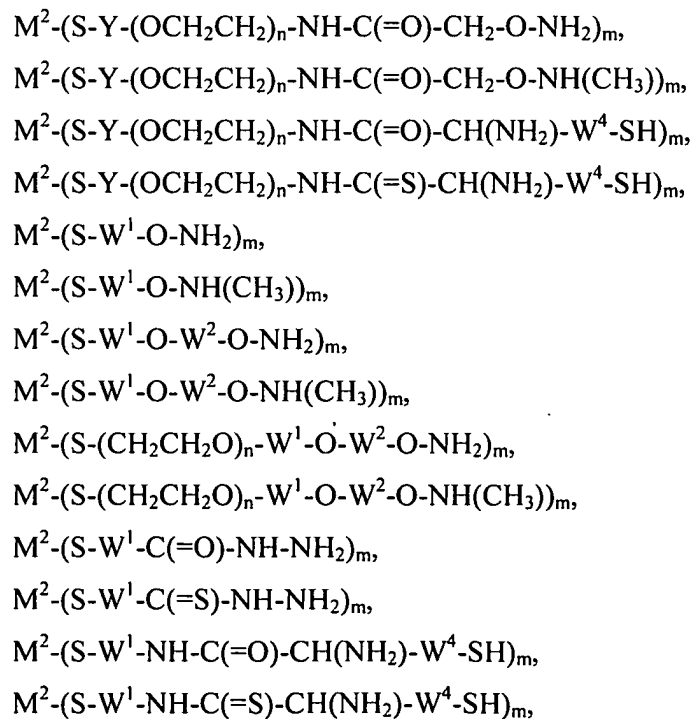
wherein, R is an organic residue, S is a sulfur atom, M^I is a metal and n indicates a stoichiometric ratio of (R-S) group with respect to M^I and is an integer equal to or greater than 1; or

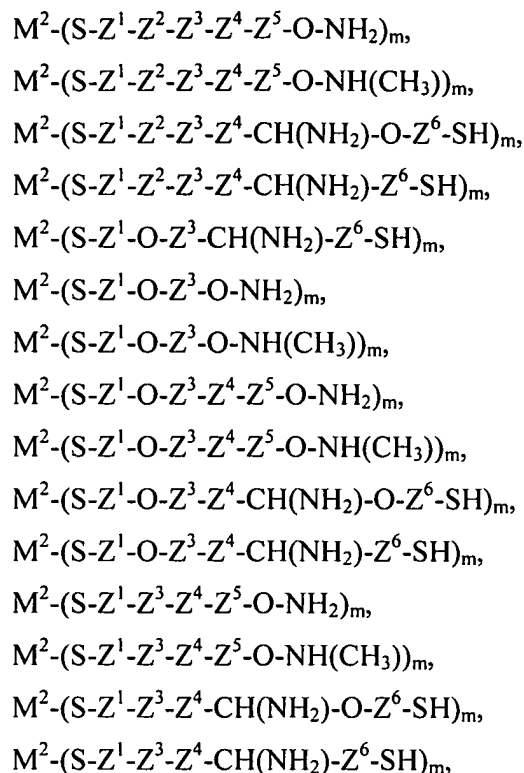
a metal-organic residue complex represented by the general formula (IV):



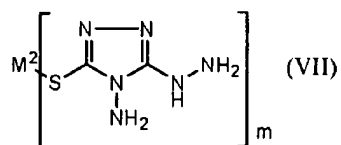
wherein R and S are the same as defined above, M^I at both ends are same metal entities and X is lower alkylene or lower alkenylene.

25. (Withdrawn) The kit of claim 24 wherein the metal-organic residue complex is represented by the following formula:





or the general formula (VII):



wherein, M^2 is a metal, m indicates a stoichiometric ratio of an organic residue with respect to M^2 and is an integer equal to or greater than one, the organic residue comprises a sulfur atom, Y , W^1 and W^2 are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene, W^4 is C1-C2 alkylene;

Z^1 is substituted or unsubstituted arylene or heteroarylen;

Z^2 is a nitrogen-containing heterocycle, Z^3 and Z^5 are independently C1-C12 alkylene, Z^4 is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-, Z^6 is C1-C2 alkylene; and

n is an integer between 1 and 10, inclusive.

26. (Withdrawn) A method according to any one of claims 1 to 4 and 6, wherein the mass spectrometry is carried out by LDI-TOF MS method.

27. (Withdrawn) A method according to claim 10, wherein the mass spectrometry is carried out by LDI-TOF MS method.

28. (Withdrawn) A method according to claim 5, wherein the metal is gold, silver, cadmium or selenium.

29. (Withdrawn) A method according to claim 5, wherein the mass spectrometry is carried out by MALDI-TOF MS method.

30. (Withdrawn) A method according to claim 5, wherein the mass spectrometry is carried out by LDI-TOF MS method.